

[0005] Document DE 100 45 236 A1 describes a household appliance which has a body and a door and in which the front forms a unit with the door, a console-type display unit being integrated into the handle of the door. Here, in contrast to the aforementioned household appliances, the display unit has only display elements.

[0006] Furthermore, it is known from DE 91 13 763 U1 to integrate a user control and display unit into a handle of a household appliance.

SUMMARY

[0007] Therefore, it is an object of the present invention to provide a household appliance that provides improved protection of the control electronics of the user control and display unit from elevated temperatures.

[0008] The present invention provides a household appliance including: a body having a front; an appliance port including at least one of a cooling air inlet port and a vapor exhaust port disposed on the body; a door; and a console-type user control and display unit, the user control and display unit including a control and display element, a housing, and control electronics disposed in the housing. The control electronics is configured for signal communication with the control and display element and with power electronics of the household appliance, at least a first portion of the user control and display unit being disposed on the door so as to be cooled by a flow of ambient air and so as to shield, when the door is in a closed position, the appliance port from view in a direction perpendicular to the front of the body.

[0009] One particular advantage that can be achieved with the present invention is the improvement of the protection of the control electronics of the user control and display unit from elevated temperatures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Exemplary embodiments of the present invention are shown in the drawings in a schematic way and will be described in more detail below. In the drawings,

[0011] FIG. 1 is a partial perspective view of a first exemplary embodiment of a household appliance according to the present invention;

[0019] In another refinement of the teaching according to the present invention, the user control and display unit takes the form of a display unit having control elements. In this manner, the overall visual appearance of the user control and display unit is further improved.

[0020] In another advantageous refinement, when the door is closed, a cooling air inlet port or vapor exhaust port disposed on the body is covered by the display and user control unit in such a manner that the inlet or exhaust port cannot be visually perceived when looking in a direction perpendicular to the outer surface of the front. In this manner, the overall visual appearance is further improved.

[0021] In one advantageous refinement, when the door is closed, a cooling air inlet port or vapor exhaust port disposed on the body is covered by the display and user control unit in such a manner that the air entering the inlet port and the air emerging from the exhaust port, respectively, is diverted by the display and user control unit into a predetermined direction. In this manner, the number of components is reduced.

[0022] In another advantageous refinement, the user control and display unit is mounted on the front in a manner that substantially avoids heat transfer between the body and/or door and the user control and display unit. This further improves the thermal isolation of the user control and display unit, and thus of the control electronics, from the remainder of the household appliance, which heats up during the operation of the household appliance.

[0023] FIG. 1 shows a first exemplary embodiment of an inventive household appliance which takes the form of a cooking appliance and of which only the two-part front 2 is shown. When the household appliance of the present invention is in the normal operating position, front 2 of the household appliance extends substantially perpendicular to an installation surface of the household appliance. A console-type user control and display unit 6 is provided on outer surface 4 of front 2. In this exemplary embodiment, user control and display unit 6 takes the form of a so-called touch screen 6.1, i.e., a possible type of a display unit having control elements. The interior of housing 6.2 of user control and display unit 6 accommodates control electronics 5, which are in signal communication 7 with control and display elements 6.1 of user control and display unit 6 and with power electronics 9 located in the remainder of the household appliance.

[0024] Housing 6.2 of user control and display unit 6 is arranged on outer surface 4 of front 2 in such a manner that at least the area of housing 6.2 where the control electronics 5 are located is permanently traversed by a flow of ambient air. This becomes particularly apparent from FIG. 2.

[0025] In the present exemplary embodiment, the household appliance has a body 11 and a door 8, and front 2 includes an upper part and a lower part, the upper part being attached to the body and the lower part forming a unit with door 8. When door 8 is closed, the body and door 8 bound a cooking chamber. User control and display unit 6 is disposed on the upper part of front 2 on the outer surface 4 thereof. Door 8 has a handle 10 attached thereto. Handle 10 is designed such that it gives the visual impression of an extension of console-type user control and display unit 6 when door 3 is closed, as shown in FIG. 1.

[0026] When the household appliance of the present invention is in the normal operation position shown in FIG. 1, user control and display unit 6 and handle 10 are substantially equally spaced from the lateral edges 2.1 of front 2.

[0027] FIG. 2 shows the first exemplary embodiment in a partial side view. As can be clearly seen from FIG. 2, housing 6.2 of user control and display unit 6 is arranged on outer surface 4 of front 2 in such a manner that at least the area of housing 6.2 where the control electronics 5 are located is permanently traversed by a flow of ambient air. To this end, in the present exemplary embodiment, user control and display unit 6 is mounted to the upper part of outer surface 4 of front 2 by means of mounting blocks 12 in a manner known to those skilled in the art. In this exemplary embodiment, the signal transmission link 7 between the control electronics located in housing 6.2 and power electronics located in the body 11 is provided by electrical wires running through one of mounting blocks 12. Alternatively, any other signal transmission link known to those skilled in the art could be used.

[0028] The household appliance of the present invention, therefore, provides improved protection of the control electronics of the user control and display unit from elevated temperatures.

[0029] In order to further improve this effect of the aforementioned arrangement of user control and display unit 6, which provides a permanent flow of ambient air around housing

6.2, the mounting blocks 12 of the present exemplary embodiment are designed in a manner that substantially avoids heat transfer between the upper part of front 2 and/or the body 11 and user control and display unit 6. To this end, mounting blocks 12 are made from a material having a low thermal conductivity. Alternatively, insulating layers having a low thermal conductivity could be provided between mounting blocks 12 and user control and display unit 6 and/or the upper part of front 2. Furthermore, it is also conceivable to provide the back of user control and display unit 6, which faces the upper part, with a coating that reflects thermal radiation. Moreover, other measures known to those skilled in the art and suitable for minimizing the heat transfer between the upper part of front 2 and user control and display unit 6 may also be used, alone or in combination with each other.

[0030] It is possible that when door 8 is closed, a cooling air inlet port or vapor exhaust port disposed 12 on the body 11 is covered by display and user control unit 6 in such a manner that the inlet or exhaust port cannot be visually perceived when looking in a direction perpendicular to outer surface 4 of front 2. In the embodiment shown in FIG. 5, a portion of control and display elements 6.1 of user control and display unit 6 is disposed on handle 10. In other embodiments, all of control and display elements 6.1 may be disposed on handle 10, or may form a unit with handle 10 as shown FIG. 4.

[0031] Alternatively or additionally, it is also conceivable that when door 8 is closed, the cooling air inlet port or vapor exhaust port is covered by display and user control unit 6 in such a manner that the air entering the inlet port and the air emerging from the exhaust port, respectively, is diverted by display and user control unit 6 into a predetermined direction.

[0032] FIGS. 3 and 4 illustrate a second exemplary embodiment of a household appliance according to the present invention. Here, in contrast to the first exemplary embodiment, user control and display unit 6 is attached to door 8 of front 2, user control and display unit 6 forming a unit with handle 10.